

FINAL REPORT

The Population of Small Comets: Optimum Techniques for Detection

NAGW-4579

The goals of this project were: (1) to present evidence to the scientific community for the importance of the small comet population and (2) to develop techniques for optimum detection in order to characterize the population. The work has been carried out by D. Schleicher (Lowell Observatory), M. A'Hearn and Y. Fernandez (University of Maryland), I.A.F. Stewart, C. Randall, and J. Brandt (University of Colorado).

Publications are as follows:

- (1) Brandt, J.C., A'Hearn, M.F., Randall, C.E., Schleicher, D.G., Shoemaker, E.M., and Stewart, A.I.F., 1996, "On the Existence of Small Comets and their Interactions with Planets", *Earth, Moon, and Planets*, **72**, 243-249.
- (2) Brandt, J.C., A'Hearn, M.F., Randall, C.E., Schleicher, D.G., Shoemaker, E.M., and Stewart, A.I.F., 1997, "Small Comets (SCs): An Unstudied Population in the Solar System Inventory, in *Completing the Inventory of the Solar System*, ASP Conference Series, 107, T.W. Rettig and J.M. Hahn, eds., pp. 289-297.
- (3) Brandt, J.C., and A'Hearn, M.F., 1997, "An Update on the Problem of Small Comets", *Highlights in Astronomy*, from the August 1997 IAU General Assembly, Kyoto, Japan, in press.
- (4) Brandt, J., A'Hearn, M., Fernandez, Y., Randall, C., Schleicher, D., and Stewart, I., "The Lost Tribe of Small Comets", 1998, BAAS, in press, Abstract. (To be presented at the January 1998 AAS Meeting in Washington, DC).

Our work on techniques has been to develop algorithms for searching images for SCs based on the distinctive properties of comets: (1) motion with respect to background stars; (2) extended source with most light coming from the coma rather than the nucleus; and (3) characteristic spectral signature. Our work has been extended by a small grant (NGT 5-4561). This will enable us to complete the current stage of algorithm development and to apply the algorithms to ultraviolet images taken by the MSX Spacecraft if they become available in the near future.

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Distribution

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